Getting set for Field Day? Here's a little gem that can add two extra bands to your log.

A High Gain Horn Antenna For 220 And 420 MHz

BY T.E. WHITE*, K3WBH

The secret of successful mountain topping for field day or other portable operation is getting the maximum out of the fewest pieces of gear on the most bands. Here is an antenna, of a type largely neglected by amateurs, which will enable fast changeover between 220 and 420 just by switching a single feedline to one or the other transmitter.

No other antenna configuration will give a gain increase of 6 dB simply by doubling the frequency while holding its size constant. The horn, operating on its fundamental (200 MHz in this case), will provide 9 db gain, and 15 db on its second harmonic (400 MHz here). This design, simple to construct, erect, and take down, will get you those contest multipliers for 2-band operating without stringing the mountain with skywire.

Construction

Fig. 1 shows a horizontally polarized (sides vertical) horn one wavelength on a side at 220 MHz or two wavelengths at 440 MHz. Fig. 2 shows the supporting framework and mounting. Fig. 3 shows the feed system.

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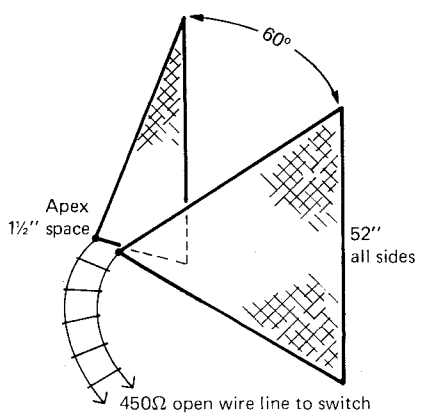


Fig. 1- The horizontally polarized horn antenna. It is one wavelength on 220 and two wavelengths on 420 MHz.

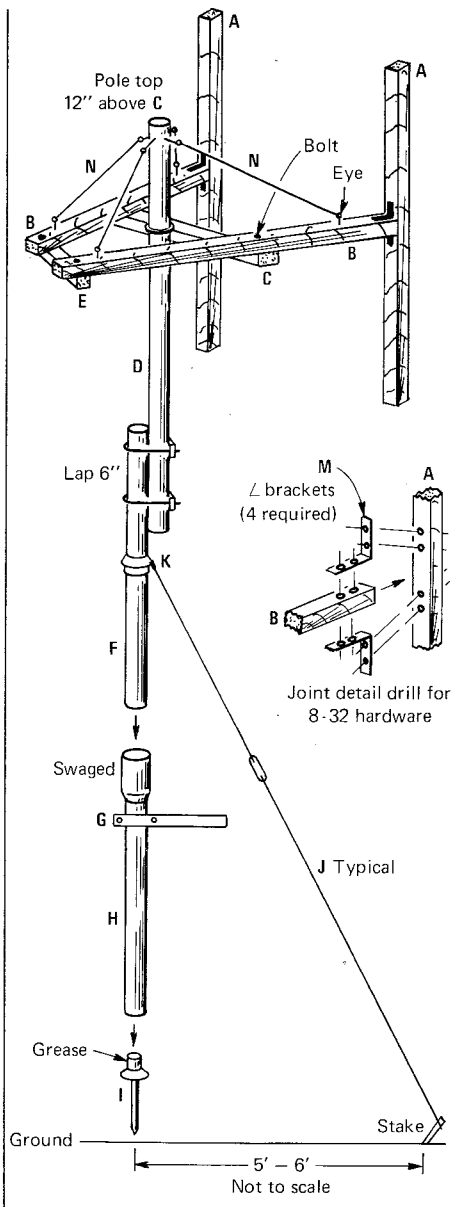


Fig. 2- The support system and mechanical framework for the two band horn antenna.

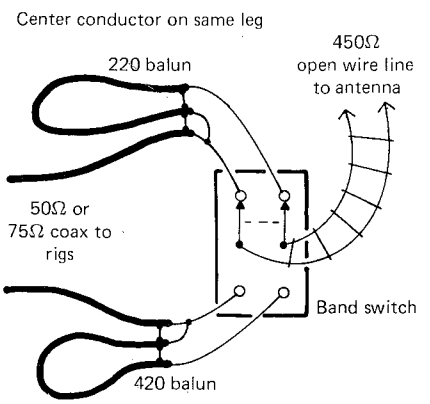
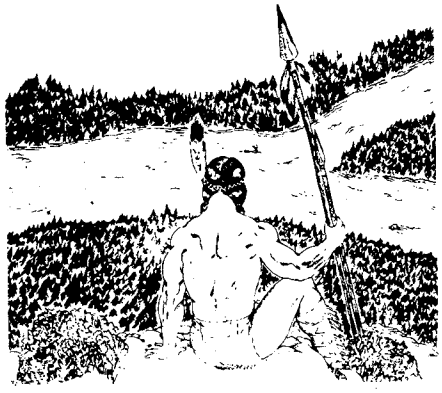


Fig. 3- The horn antenna feed system.

Fig. 4 shows cutting of the "wings." Remember, you're going to encounter strong winds, so guying as shown is a good idea. It may even be advisable to attach a rope bridle to one side where part *C* joins *B* and anchor the rope on the ground while working a particular direction. Rotating the "open end" only to the 4 cardinal compass points will give ample 360 coverage, incidentally.

Home Assembly

After drilling and pre-assembly of each A to B section cut the chicken wire out of a 5 foot wide roll as per fig. 4. Watch sharp edges! About 8 linear ft. of wire is needed. Start at the cut 8 inches in from one side. Lay off angles and chalk along a board or straight-edge to trace cuts. Dimensions are not critical. Forward edge of "wing" laps two to three inches out ahead of A. Staple each wing to A/B. Bolt holes for C and E attachment in



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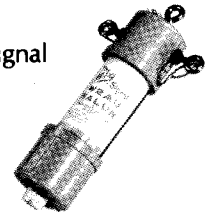

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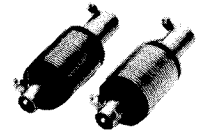

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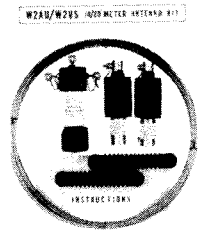

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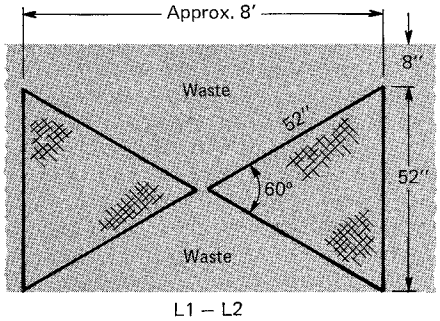
the field and screw eye holes are done before chicken wire stapling.

It is a good idea to trial-assemble the entire antenna structure up to and including pole D. Install screw eyes and cut non-metallic guys to length before going into the field. Drill U-bolt holes at mid-C for attachment to D. Be sure to use serrated anti-twist clamps with U-bolts.



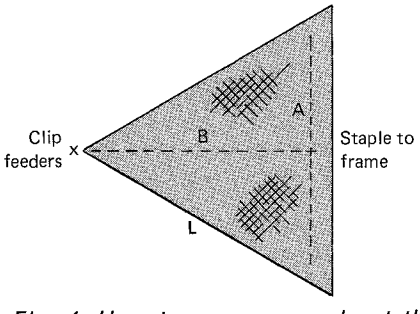


Fig. 4- How to measure and cut the "chicken wire" for the two band horn antenna.

Field Assembly

Pre-erect the mast without the antenna to measure off the main guys and to install the guy ring. Locate stakes at 120 degree intervals and semi-tighten turnbuckles. Take the mast down. Then assemble all components onto pole D. Attach feeder (ladder line) to apex with copper alligator or "pee-wee" clips and tape well, hooking the tape around the last ladder line spreader.

Drive the ground stake (TV push-up mast base type) and grease, as entire mast will rotate thereon. Attach D to joined F and H mast sections with two clamps and U-bolts. Walk it upright, drop it on ground stake and guy it to the radial stakes. Attach turning handle, position feeder into operating position and hook up to band-change and balun assembly. Tune up rigs and start piling up contacts!

Note there is no metal (masts, guys, etc.) within area between the wings of the antenna proper when assembly is complete. An interesting experiment would be (for fixed-direction point to point contacts) to operate two of these side by side, spread 104 in. mast to mast, with an equal-length branched phasing harness. CQ

Bill Of Materials

Item	Qty	Size	Material
A	2	48"	1 × 1 Wood
B	"	48"	" "
C	1	36"	" "
D	1	48"	1¼ Ø Wooden Dowel or Closet Pole
E	1	4"	1 × 1 Wood
F	1	5'	TV Mast
G	1	—	Mast Turning Handle
H	1	5'	TV Mast
I	1	—	Ground Stake—TV Type
J	3	—	Guy Wire & Turn Buckle
K	1	—	Guy Collar & Slip Ring
L	2	52" per side	Chicken Wire (see Fig. 4)
M	4	—	Angle Brackets with 8-32 Nuts and Bolts
N	4	—	Non-Metallic Guys with Screw Eyes